



United States
Department of
Agriculture

Agricultural
Research
Service

Southern Region
Southern Plains
Area

Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

October 1, 1984

SUBJECT: Publication of Manuscript, "Effect of
Native Fly Dispersal etc"

TO: Dr. D. O. McInnis

THRU: Dr. Ernest J. Harris, Research Leader
Tropical Fruit & Vegetable Research Laboratory

As you know, ARS has definite publication policies which govern the public release of information collected by its scientists in the course of carrying out their research assignments. In accordance with these policies ARS review and approval at all steps in the editing and review process is a normal procedure. Final approval is based on what is said or not said in the final version of the paper. Changes in the paper and author responses to peer reviewers, or failure to respond to legitimate criticism, must have the concurrence of the appropriate Area Director.

In my opinion the manuscript which you transmitted to the Editor of Environmental Entomology on July 13 had not at that time been properly coordinated with me or with your coauthors. Since you had not responded in a concrete way to rational criticism by Dr. Krafur and two other peer reviewer, or to requests from me to you through Dr. Mackley for corrections, I recalled the manuscript from the journal. Until a number of changes are made this paper cannot published by you either as an ARS scientist or as a private individual.

Over and above containing a host of minor and a few major deficiencies and errors, the paper is written in a verbose style which would confuse the average reader of Environmental Entomology and make it difficult for that person to understand what was done and what conclusions can be drawn from the study. Table 1 should be condensed along the lines suggested by Peer Reviewer #2 (accept with major revision) and Fig. 1 should be replaced with a map worthy of publication in a scientific journal. The present map is meaningful only to persons who participated in the test.

O. H. GRAHAM
Location/Project Leader

cc:

J. R. Johnston
R. A. Bram
H. E. Brown
J. W. Mackley



United States
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Southern Region

1 October 1984

To: Dr. O.H. Graham

Subject: Proposed field release for evaluation of alpha-GDH
genotypes.

Work is progressing well on the development of sub-lines of VF-84 homozygous for the 2 common alleles of alpha-Glycerophosphate dehydrogenase. One of the main assumptions of this work is that the 2 lines are equal in all respects with the exception of the alpha-GDH locus. In order to minimize random drift of the lines I consider it to be important that laboratory and field evaluations be done simultaneously and as soon as possible after the completion of line development. I therefore feel that it is time to make firm plans for field testing these lines. For the field test I propose rearing approximately 20 liters of pupae of each line per week. Each line will be marker with a distinct color of fluorescent powder and released on the plant grounds. Hourly collections will be necessary as well as monitoring of temperature, humidity and precipitation. I propose to begin this work between March and June of 1985. The duration of the release will be 1 year.

At this time I would like to propose a meeting with you and all concerned ARS staff members to coordinate this release with on going and proposed research on the plant grounds.

David B. Taylor
Research Geneticist

cc:

J. Mackley

J. Welsh

R. Mangan

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

October 15, 1984

TO ALL SCIENTISTS:

Drs. Ralph Bram and Paul Murrman plan to arrive in Tuxtla Gtz. 0940 hrs. Nov. 8 via Mexicana Flight 211. They hope to meet with all ARS scientists on the 8th and again on the 10th. The strain change meeting will be held on the 9th; all ARS personnel will be expected to participate.

O. H. Graham



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Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

October 16, 1984

SUBJECT: Research Priorities for the Screwworm
Eradication Program

TO: W. H. Sudlow
Chief Staff Officer, Screwworm Eradication
USDA-APHIS-VS
Hyattsville, MD

Thank you for sending me a copy of the Research Priorities for Screwworm Eradication for FY-1986, 1987, and 1988. I have discussed this outline with Dr. Harold Brown by telephone and I believe he has relayed our views to you. As a whole, the program is comprehensive yet realistic and the possibility of increased funding is encouraging. Certainly additional funds will be required if ARS is to meet its responsibilities in the barrier zone and at the same time initiate research in Central America that will be needed as a basis for an eradication program in that region.

I hope that in the meeting here on Nov. 9, or some other appropriate time, there will be some amplification and explanation of what is meant by "New Factory Strain Development". The ARS group in Tuxtla needs more exact information as to the number of new strains needed (one per year, more than one, less than one?), the role of Methods Development in new strain development, and the availability of facilities for strain development. If the routine development of new strains, as distinguished from research on the genetics of strain development, will be an ARS responsibility through FY'87, our agency will need to employ one or more Category III scientists for this assignment. Our ARS career advancement system penalizes Category I scientists too severely if they devote a substantial portion of their time to service functions.

Hopefully the ARS group will be fully staffed (8 scientists + 1 administrative assistant; a new research leader and 2 new hire scientists will be needed) early next year. This group should be able to respond effectively to the 8 projects listed except for item 4. Lack of progress on the insecticidal control of screwworms this year has primarily been due to the lack of animal facilities. In short, for meaningful tests of insecticides, one must work with screwworm-infested livestock and to attempt to do so at Tuxtla, or any other screwworm-free area, would because of fly-security regulations be very tedious and expensive. Perhaps others will see a solution which is not obvious to me, but I do not see a way of testing insecticides at Tuxtla during FY-85, much less 86 or 87.

O. H. Graham

O. H. GRAHAM
Research Leader

cc: J. R. Johnston
H. E. Brown
R. A. Bram

*copy of enclosure in
folder "Research Priorities
VS Program FY 86, 87 & 88"*

REFERENCE SLIP

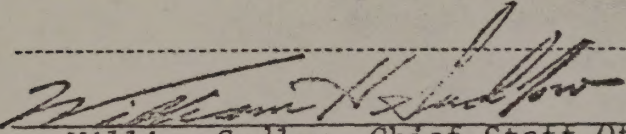
9/27/84

TO

Dr. O. H. Graham

☒ ACTION☐ NOTE AND RETURN☐ APPROVAL☐ PER PHONE CALL☐ AS REQUESTED☐ RECOMMENDATION☐ FOR COMMENT☐ REPLY FOR SIGNATURE OF☐ FOR INFORMATION☐ RETURNED☐ INITIALS☐ SEE ME☐ NOTE AND FILE☐ YOUR SIGNATURE

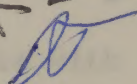
REMARKS Please review the updated ARS
research proposals, make corrections
as needed, and return to me by c.o.b.
October 20, 1984.


FROM William Sudlow, Chief Staff Off.
Screwworm Eradication
Hyattsville, MD

For use by Ralph
Williams in presenting
the Highlights of
Medical & Veterinary
Entomology in San
Antonio -

your comments
are invited - any
suggestions for improve-
ment?

Sends love to me! WLR

RLH


SCREWORM ERADICATION PROGRAM

1984 was a year of unprecedented progress for the screwworm eradication program. In South Texas, an introduced infestation of screwworms was eliminated in August, 1982 and the species has not been seen in the United States since that date. In Mexico, when the rainy season began in May of this year, about 77% of the national territory was screwworm-free and the only infestations encountered north of Mexico City were considered to have been introduced infestations caused by the illegal movement of infested livestock from southern Mexico. Progress of eradication from north to south is indicated by the movement of the critical lines (slide 1). In July 1984, at least 3 months ahead of schedule, the barrier zone was in place (slide 2), the distribution centers in the north, first Tampico and then Guadalajara, were closed and all sterile flies were packaged at the distribution center at Tuxtla Gutierrez (slide 3) with only boxed flies going to a small number of subcenters (slide 4). The barrier zone has been highly successful and only rarely are infestations found within it; the ones that have appeared have mostly been found near the 92nd meridian, or the western edge of Guatemala.

Rapid progress in 1984 can be attributed to (1) the development of a body of experienced, dedicated employees in both the Field Operations and Fly Productions groups, (2) the geography of Mexico - roughly, the country is shaped like a large triangle with its apex to the south (i.e., as the program moved south the distance from ocean to ocean grew progressively shorter), (3) the availability of a high quality strain which for 2 years did not deteriorate in mass production (4) full support of the program by livestock producers both as individuals and through their organizations, and (5) support by other agencies of the Mexican government. Dire predictions of failure in southern Mexico because of the appearance of some form of reproductive isolation between native flies and released sterile flies were

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never realized. Nothing has been seen by program managers or by researchers living and working in southern Mexico to support hypotheses of assortative mating, cryptic species, or the occurrence of parthenogenetic types of screwworms. In all parts of Mexico, a single, mass-produced strain has functioned superbly against all native populations whenever & wherever program execution has achieved accepted standards.

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Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

October 9, 1984

SUBJECT: Scientific Studies Proposed by the Commission

TO: Dr. R. A. Bram

Dr. Arturo Martinez y Tapia handed me a copy of a memorandum he and Mr. J. D. Hoffman had recently received. I have made a rough translation to English and am forwarding a copy for your information.

Since the items listed are very similar to several of the items in our ARS program, I offered to make any information we have already collected available to the Methods group and to help them with their planning.

O. H. GRAHAM
Research Leader

cc:

J. R. Johnston (with enclosures)

H. E. Brown (with enclosures)

Enclosures

UNITED STATES DEPARTMENT OF AGRICULTURE
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(Translation of letter dated Sept. 24, 1984)

In view of the accelerated advance of the program and bearing in mind that Methods Development can carry out studies that would support the complete success of the Commission (it is appropriate) that we mention various studies that could be carried out by (Tuxtla personnel) since the plant now has the equipment and experienced personnel needed (for such studies), the studies proposed being the following:

- A. To develop alternatives which will in advance indicate that a production strain is deteriorating.
- B. Investigate new larvicides.
- C. Develop fly security measures which will be 100% effective.
- D. Develop designs for fly traps which would be more efficient than the ones now in use.
- E. Studies to improve the efficiency of the adult attractant and to obtain new ones.
- F. Develop a method for determining the age of larvae (time in preservative) submitted for identification.
- G. Study methods for determining the host from which larvae were collected (after they are received for identification).
- H. Studies of fly behavior in natural environments.
- I. Studies to determine the existence or non-existence of predators of C. hominivorax in any of its stages of development.
- J. Develop methods for detecting screwworm infested wounds in animals going through quarantine stations.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

(Translation of letter dated Sept. 17, 1934)

In view of the accelerated advance of the program and having in mind

that methods development can carry out studies that would support the

complete success of the Foundation (if it is appropriate) that we mention

various studies that could be carried out by (Textile personnel) since the

plant now has the equipment and experienced personnel needed (for each

study), the studies proposed being the following:

A. To develop alternatives which will in advance indicate that a

production strain is desirable.

B. Investigate new varieties.

C. Develop fly security measures which will be 100% effective.

D. Develop designs for fly areas which would be more efficient than

the ones now in use.

E. Studies to improve the efficiency of the adult attractant and to

obtain new ones.

F. Develop a method for determining the age of flies (time in

post-embryonic) suitable for identification.

G. Study methods for determining the host from which flies were

collected (after they are received for identification).

H. Studies of fly behavior in natural environments.

I. Studies to determine the extent of non-resistance of persons

of C. hominivorax in any of its stages of development.

J. Develop methods for determining whether infected women in hospital

going through post-natal stages.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

We will appreciate your consideration of the above listed items and request that you prepare a protocol for each of the studies, due to the necessity of introducing the most appropriate methodology and with the goal of improving techniques for the control and eradication of the parasite and also wanting you to know that if you have any other ideas that would in practice be useful to the Commission in the period that now prevails.

(signed)

Dr. Sergio J. Martinez Guzman
Entomólogo Asesor

(signed)

Dr. Harold C. Hofmann
Entomological Advisor

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

We will appreciate your consideration of the above listed items and
request that you prepare a proposal for each of the studies, due to the
necessity of introducing the most appropriate methodology and with the goal
of improving techniques for the control and eradication of the parasite
and also wanting you to know that if you have any other ideas that would
be practice be useful to the Commission in the period that now prevails.

(signed)

Dr. Harold C. Hoffman
Entomological Advisor

(signed)

Dr. Sergio J. Martinez Guevara
Entomological Advisor



COMISION MEXICO-AMERICANA PARA LA ERRADICACION DEL GUSANO BARRENADOR

LA ENERGIA ATOMICA AL SERVICIO DEL GANADERO

LA ERRADICACION DEL GUSANO BARRENADOR

SJM/G/161/MMG

SEPTIEMBRE 24, 1984

SECRETARIA DE AGRICULTURA Y GANADERIA
SUBSECRETARIA DE PRODUCCION
RECCION MEXICANA
Calle de la Reforma, No. 100
06000 MEXICO, D.F.

DR. AGUSTIN PAGAZA GARZA
DR. RONALD E. LOWE
SUBDIRECTORES DE PRODUCCION

DR. ARTURO MARTINEZ Y T.
DR. DAVID HOFFMAN
JEFES DE INV. Y DES. EXP.

EN VISTA DEL ACELERADO AVANCE DEL PROGRAMA Y CONSIDERANDO QUE DESARROLLO DE MÉTODOS PUEDE REALIZAR ESTUDIOS QUE APOYEN EL COMPLETO ÉXITO - DE LA COMISIÓN ES QUE A CONTINUACIÓN LES MENCIONAMOS VARIOS ESTUDIOS QUE PODRÍAN REALIZARSE POR PARTE DE LA PLANTA YA QUE CUENTA CON IMPLANTOS Y EL PERSONAL DE EXPERIENCIA NECESARIOS PARA ESTO, SIENDO LOS ESTUDIOS PROPUESTOS LOS SIGUIENTES:

- A) DESARROLLAR ALTERNATIVAS QUE CON TIEMPO SUFICIENTE NOS INDIQUE CUANDO LA VARIEDAD EN PRODUCCIÓN SE ESTA DETERIORANDO.
- B) INVESTIGACIÓN DE NUEVOS PRODUCTOS LARVICIDAS.
- C) DETERMINAR MÉTODOS EFICACES EN UN 100% PARA LA SEGURIDAD BIOLÓGICA DE LA PLANTA PRODUCTIVA
- D) DESARROLLAR DISEÑOS PARA TRAMPAS DE ADULTOS QUE PUDIERAN SER MÁS EFICACES QUE LA ACTUAL EN USO.
- E) ESTUDIOS PARA MEJORAR LA EFICACIA DEL ATRAYENTE QUÍMICO DE ADULTOS U OBTENER OTROS NUEVOS.
- F) OBTENER UN MÉTODO PARA DETERMINAR LA EDAD DE LAS LARVAS ENVIADAS A LOS LABORATORIOS DE DIAGNÓSTICO.
- G) INVESTIGAR MÉTODO PARA DETERMINAR A LA ESPECIE ANIMAL QUE PARASITA RON LAS LARVAS ENVIADAS AL LABORATORIO.

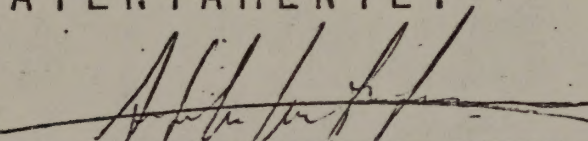
H) ESTUDIOS SOBRE LA CONDUCTA DEL PARÁSITO EN SU ECOLOGÍA NATURAL

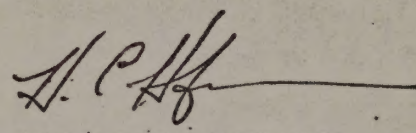
I), INVESTIGACIÓN PARA ENCONTRAR O NO LA EXISTENCIA DE PREDADORES DE C.
HOMINIVORAX EN CUALQUIERA DE SUS FASES DE DESARROLLO.

J) DESARROLLAR MÉTODOS PARA LA DETECCIÓN DE ANIMALES INFESTADOS A SU PA
SO POR LAS ESTACIONES CUARENTENARIAS.

AGRADECEREMOS CONSIDEREN LO ANTES EXPUESTO SOLICITÁNDOLES PRESENTEN UN
PROTOCOLO DE CADA UNA DE LAS INVESTIGACIONES, DEBIDO A LA NECESIDAD DE
INTRODUCIR LA METODOLOGÍA MÁS APROPIADA CON EL FIN DE MEJORAR EL CONTROL
Y ERRADICACIÓN DEL PARÁSITO, DESEANDO TAMBIÉN SABER SI TIENEN ALGUNA
OTRA IDEA QUE EN LA PRÁCTICA PUDIERA SER ÚTIL A LA COMISIÓN EN LA ETAPA
QUE ACTUALMENTE PREVALECE.

ATENTAMENTE.


DR. SERGIO J. MARTÍNEZ GUZMÁN
ENTOMÓLOGO ASESOR


DR. HAROLD C. HOFMANN
ENTOMÓLOGO ASESOR

C.C.P. DIRECTORES GENERALES
SUBDIRECTORES GENERALES
SUBDIRECTORES DE OPS. DE CAMPO



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Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

October 16, 1984

Dr. Ralph E. Williams
Department of Entomology
Purdue University
W. Lafayette, Ind. 47907

Dear Ralph:

In response to your request I have drafted a brief summary of the current status of the screwworm eradication program and am enclosing a copy for your information. As you will see, it is not in final form and lacks 4 slides which I will send later. A lady who does scientific illustrations for us is not in Tuxtla at present but as soon as she returns we will prepare the slides and make any changes that might be needed in the text.

We appreciate your interest in our program. If you have questions or need information other than this, please let me know.

Sincerely,

O. H. GRAHAM
Location/Project Leader

cc:

R. A. Bram
H. E. Brown



RECEIVED OCT 17 1984

COMISION MEXICO-AMERICANA PARA LA ERRADICACION DEL GUSANO BARRENADOR

LA ENERGIA ATOMICA AL SERVICIO DEL GANADERO

R A D I O G R A M A

MEXICO D.F. OCTUBRE 17 DE 1984.

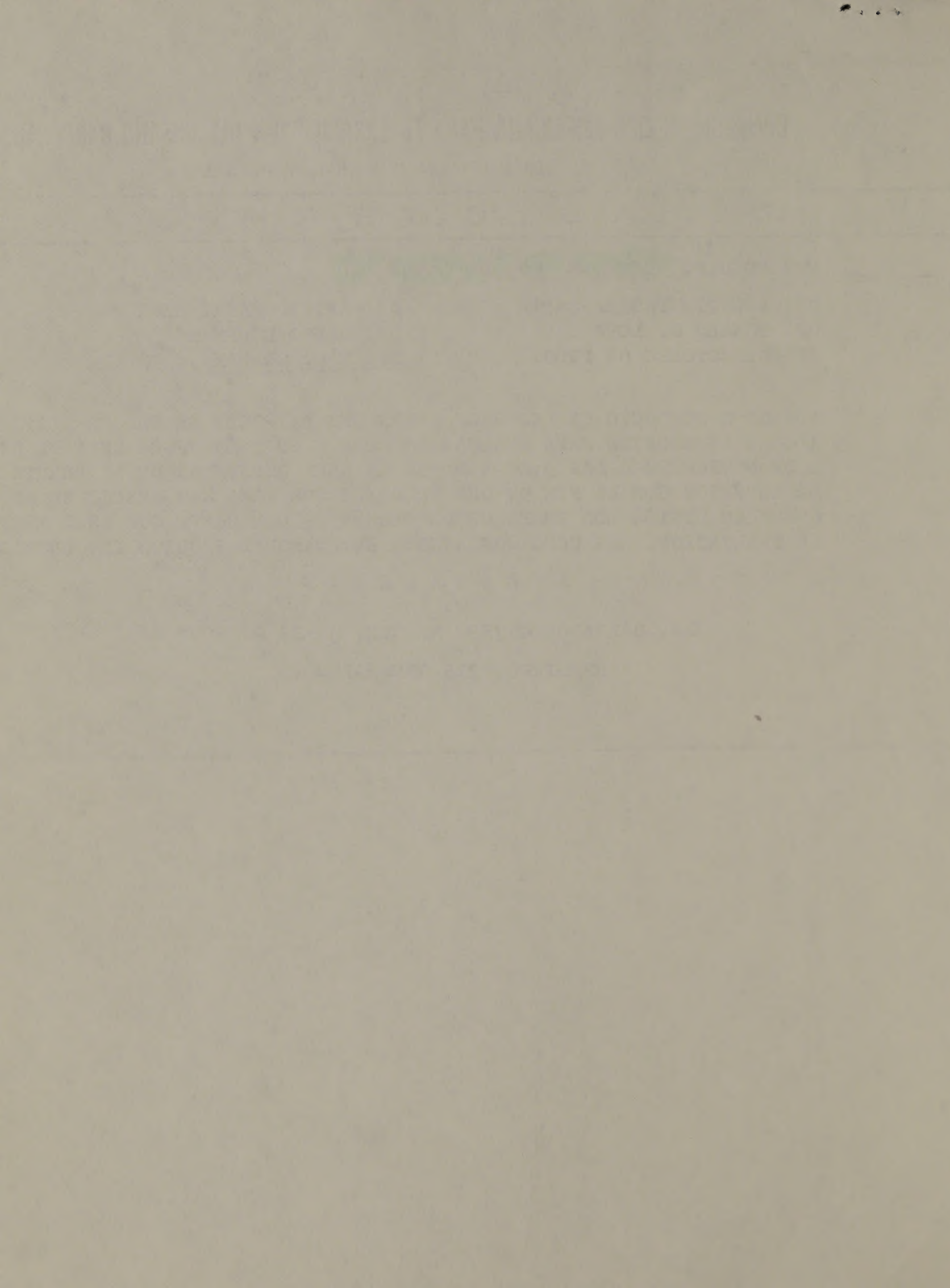
DR. AGUSTIN PAGAZA GARZA
DR. RONALD E. LOWE
SUB/DIRECTORES DE PROD.

DR. ARTURO MARTINEZ Y T.
DR. DAVID HOFFMAN
DR. H.O. GRAHAM

POR ESTE CONDUCTO SE LES HACE SABER QUE LA FECHA EN QUE SE LLEVARA A CABO LA REUNION PARA EVALUAR LA CEPA A-82 Y LA VF-84 SERA EL DIA 9 DE NOVIEMBRE A LAS 9:00 A.M. EN LA SALA DE JUNTAS DE LA PLANTA. LO ANTERIOR CON EL FIN DE QUE COORDINE QUE PARA ESE EVENTO SE ENCUENTREN LISTOS LOS TRABAJOS DE LABORATORIO Y CAMPO QUE FUNDAMENTEN LA EVALUACION, ASI COMO QUE ASISTA EL PERSONAL TECNICO INVOLUCRADO.

A T E N T A M E N T E

DR. SALVADOR CAJERO A. DR. JAMES E. NOVY
SUB/DIRECTORES GENERALES .





United States
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Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

October 23, 1984

Dr. Arturo Martinez y Tapia
Dr. J. David Hoffman
Methods Development Section
Fly Production Plant
Tuxtla Gutierrez, Chiapas

Gentlemen:

On October 20 the following sheep from the field test in Yucatan were returned to Tuxtla and are now with the other sheep at the plant:

Ear tag nos. #204, 215, 216, 217, 218, 220, 222, 511, 520, 521, 526, 542, 549, 556, 561, 567, 577, 579, 581, 590, 595, 597, 598 = 23 sheep plus 5 sheep without ear tags; total 28 sheep. Also, one ear tag #504, for sheep that died in test.

For your information I am enclosing a tabulation of sheep carried from the plant in 1984 for field test and those returned. A total of 47 were received by Methods personnel this year and 28 have been returned.

Sincerely,

O. H. GRAHAM
Location/Project Leader

Encl.

cc:

R. E. Lowe
H. C. Hofmann

Sheep used by Methods Development in Field Tests - 1984

<u>EAR TAG No.</u>	<u>DATE DEPARTED ARS</u>	<u>DATE RETURNED</u>
504	02-04-84	DEAD ear tag ret.
510	"	-
520	"	10-20-84
526	"	10-20-84
532	"	-
545	"	-
546	"	-
572	"	-
575	"	-
577	"	10-20-84
581	"	10-20-84
587	"	-
588	"	-
589	"	-
593	"	-
521	03-02-84	10-20-84
522	"	-
531	"	-
533	"	-
540	"	-
570	"	-
574	"	-
579	"	10-20-84
580	"	-
597	"	10-20-84
204	05-22-84	10-20-84
215	"	10-20-84
216	"	10-20-84
217	"	10-20-84
218	"	10-20-84
219	"	-
220	"	10-20-84
221	"	-
222	"	10-20-84
511	"	10-20-84
538	"	-
542	"	10-20-84
549	"	10-20-84
550	"	-
556	"	10-20-84
561	"	10-20-84
567	"	10-20-84
582	"	-
590	"	10-20-84
595	"	10-20-84
598	"	10-20-84
600	"	-

(In addition, 5 sheep were returned which had lost ear tags in the field)



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Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
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October 25, 1984

Dr. Dennis R. Ring
Department of Entomology
Texas A&M University
College Station, Texas 77843

Dear Dennis:

The revised manuscript and your letter of October 5 arrived here this week and I have asked Cindy to transmit the original and two copies to the Editor of the Journal of Medical Entomology. I approve of the changes you have made and feel that the manuscript is now ready for submission to the journal. The change in title which you and Don have made is quite appropriate. Any further suggestions for change which I have will be minor and can be done at the same time that you make changes in response to the journal peer reviews.

Concerning the swormlure papers, I have a version of the field evaluation paper which you sent to me on August 30. I know that Jim Mackley has been working on this paper and will probably soon have some suggestions for you. I am less sure about what Harold and Del Var are doing but I suspect they will concur with any changes which Jim will propose. So perhaps you and Jim can soon have this ready for peer review. I will try to do a review at the same time it goes out for ARS peer review.

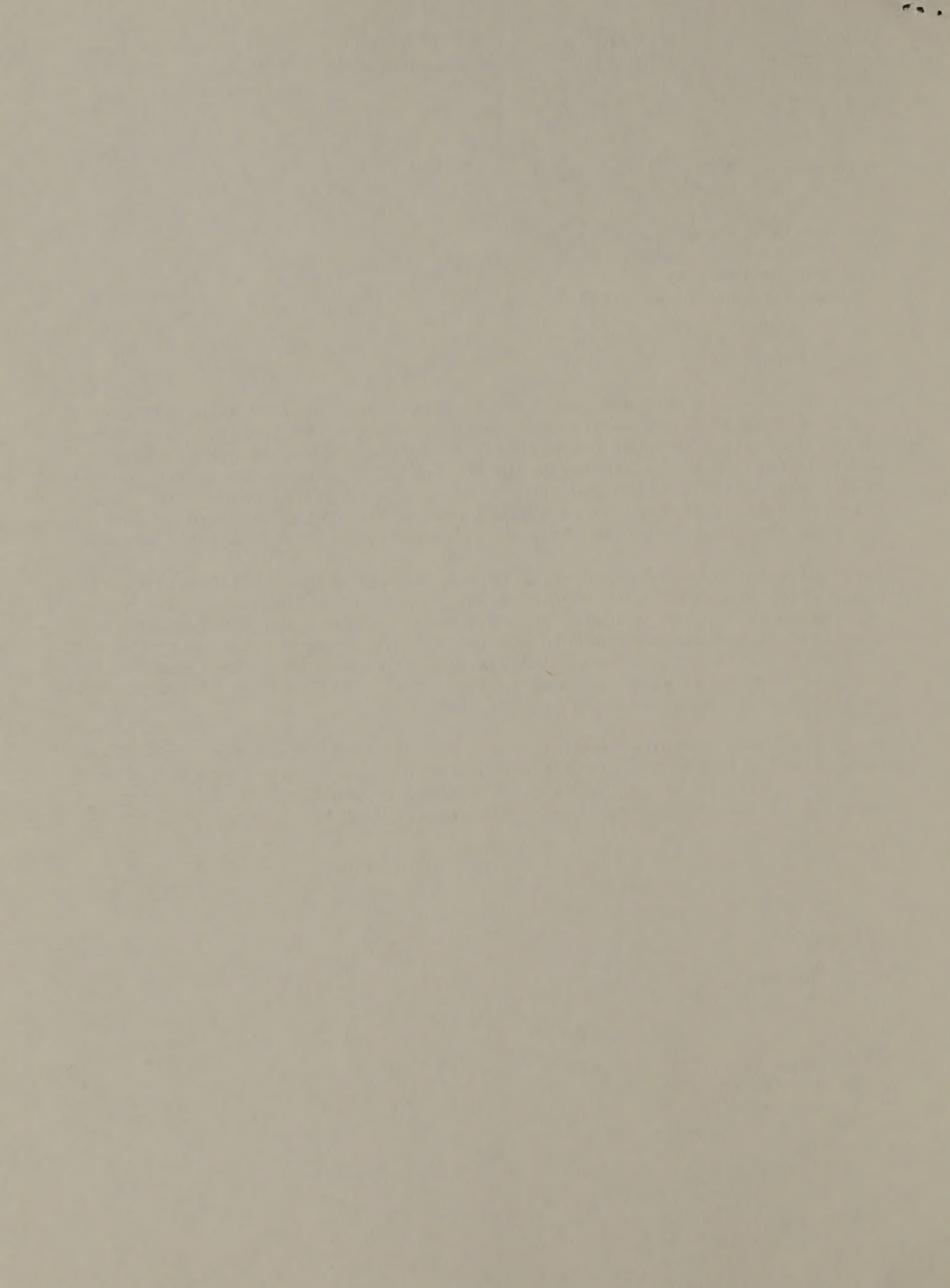
Everything here is going amazing well. Virtually no screwworms can be found west of 92° W longitude. Peterson and Brenner have returned to the U.S. and new people will be coming in soon. The research program here is gaining momentum each week; in many ways I will regret leaving in December.

Sincerely,

O. H. GRAHAM
Research Leader

cc:

H. E. Brown (w/copy of incoming)
J. W. Mackley (" " ")
H. D. Petersen (" " ")



October 5, 1984
Dept. of Entomol.
Texas A&M Univ.
College Station, TX 77843

Dr. O. H. Graham
Screwworm Research
P. O. Box 267
Weslaco, Texas 78596

Dear Dr. Graham:

Thank you very much for your kind letter dated Sept. 28, and your careful review of the Chrysomya paper. I read the May 1984 guide and I believe the manuscript conforms to these guidelines. I apologize for omitting the paragraph describing the purpose of the research at the end of the introduction. It is in my handwritten draft but got omitted in the draft you were sent. It will be included in this and future drafts.

You mention that I should not repeat data from tables in the discussion and present result not in the tables. I believe that I have done this in many of the cases that you pointed out. The 30 3- and 4- day old larvae mentioned in para 2, page 7 are separate from those reared in Feb. and Sept. The results from these larvae will not be presented anywhere if not included in the text. This is also the case for the pupae reared in Feb. (para 3) and the field collected adults (para 4 and para 1, page 8). I do not know of another way to present these results. Do you have any suggestions? You are correct regarding the pupae on the bottom of page 7 and top of 8. I have rewritten this part.

I have contacted Don about the macellaria section. He suggested that I use unpublished data instead of his reference for the secondary screwworm reference. I have done this in this draft. Please let me if you feel that this is unacceptable and what you wish to do. He also suggested that genetics be taken out of the title because he feels that it is a minor part of the paper. I have done this in this draft. What is your opinion?

You should have the first swormlure paper and I am still working on the second one. Unfortunately, the progress is slow. I will renew my efforts to get a draft to you soon. How is the review of the first SL paper coming? I have not heard from any of the coauthors although each has been sent a draft.

How is everyone doing down there? We are doing ok. I heard that you got stabbed but that it was not serious. I hope that it was not serious and you are doing fine. Good luck to all.

Again, thank you very much for your valuable time and kind consideration. Please let me know how we should proceed. The sooner this is sent to the journal the better I will feel but I want it to be done well when it is sent.

Sincerely,

Dennis Ring

Dennis Ring
Research Associate



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Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

October 24, 1984

SUBJECT: Comparison of Two Gelling Agents

TO: Dr. Agustin Pagaza
Dr. Ronald E. Lowe

I have mentioned previously that the Water Lock gelling agent is available from the manufacturer in two forms which have been designated A-400 and G-100. Most of our experience has been with A-400 but company representatives have told Dr. R. L. Harris that the two products are chemically identical and that G-100 would sell for about \$2.20 less per kilogram than A-400. If G-100 could be used for screwworm rearing considerable money could be saved in comparison with the cost of using A-400 but a small test in our laboratory last week indicates that G-100 is inferior for screwworm rearing (see enclosed table).

In spite of this information I would recommend, if you should decide to use Water Lock in mass production, that you undertake some trials with G-100 on the production floor. It is quite possible that under your conditions of mixing and use results with G-100 would be better than in our preliminary, small-scale test.

In the ARS laboratory we are now using Water Lock for almost all of our routine screwworm rearing. The only disadvantage, which may not be a disadvantage at all, is that larvae stay on the gel diet about 24 hours longer than on meat.

O. H. GRAHAM
Location/Project Leader

Encl.

cc:
Martinez y Tapia
J. D. Hoffman
H. C. Hofmann
H. E. Brown
R. L. Harris
R. A. Bram

Comparison of Two Gelling Agents and Horse Meat in the Rearing Media for VF-84 Larvae. Test by Dr. R. L. Mangan and Biotec. Cesar Corzo, October 16-23, 1984. Yields are from 200 mg. ($\pm$ 4000) eggs.

Crawl-off Group	No. of larvae			Larval wts.(ave.)mg <u>a/</u>		
	Meat	A-400	G-100 <u>c/</u>	Meat	A-400	G-100
5 <u>b/</u>	974	-	-	61.05	-	-
6	895	-	-	62.84	-	-
7	259	550	3	65.18	63.3	60.3
8	731	848	464	73.4	67.3	62.2
9	249	97	259	74.1	69.3	66.1
10	98	1017	274	58.8	71.2	65.2
11	93	140	774	67.2	74.7	67.8
12	25	103	206	59.7	71.1	66.8
13	18	390	128	67.2	71.3	66.4
14	50	77	376	58.2	68.7	61.2
15	13	95	107	50.2	64.8	58.3
16	18	-	157	46.1	-	58.3
TOTAL	3423	3317	2748	65.4	68.8	64.5

b/ Crawl-off groups are 8-hour intervals approximately equal to the mass production schedule. Larvae in group 5 were about 76-84 hr. old at time of crawl-off.

a/ From group averages it is estimated that 28.6% of the meat-reared, 49.7% of the A-400 larvae and none of the G-100 larvae exceeded 70 mg. average weight.

c/ Label on bag reads "120T OVERS WATER LOCK; LOT. No. 1202-10+120".



United States
Department of
Agriculture

Agricultural
Research
Service

Southern Plains Area

Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

October 25, 1984

SUBJECT: Improved Screwworm Trapping Systems

TO: R. D. Peterson II
USDA-ARS-MRRL
P.O. Box 5674 State Univ. Sta.
Fargo, ND 58105

Recently the local Methods Development group has announced their intention to work on improved trapping systems for adult screwworms, presumably oriented toward trapping in remote areas (see enclosure). I pointed out to Dr. Arturo Martinez y Tapia that you had worked on this part-time for 3 or 4 years and might be able to provide valuable suggestions and advice. Do not have any notes, unpublished reports or other data that would be helpful to them or to ARS researchers? Any information you might provide would be very much appreciated.

O. H. GRAHAM
Location/Project Leader

Enclosure

cc:

C. J. Whitten
R. A. Bram
H. E. Brown
J. B. Welch



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Southern Plains Area

Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

October 26, 1984

SUBJECT: Request for Approval for Publication,
Manuscript "Incidence of the Primary and Secondary
Screwworm (Diptera:Calliphoridae) in the Central
Highlands of Chiapas, Mexico" by James W. Mackley

TO: J. R. Johnston

Subject manuscript and abstract, Form ARS 533, and the manuscript approval form are enclosed. I recommend that you approve this manuscript for publication in the Journal of Medical Entomology.

O. H. Graham

O. H. Graham
Research Leader

cc:

J. W. Mackley
H. E. Brown
Cindy Davila



United States
Department of
Agriculture

Agricultural
Research
Service

Southern Plains Area

Screwworm Research
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

November 1, 1984

SUBJECT: Contributions of Dr. R. L. Harris to the Development
of a New Screwworm Rearing Medium

TO: Dr. Donald A. Witzel, LD
USDA-ARS-VTERL
P.O. Box GE
College Station, Texas 77841

After more than two years of intermittent testing Dr. R. L. Harris has succeeded in developing an improved larval rearing medium suitable for use in the screwworm mass production plant at Tuxtla. A gelling agent is added to the food products to give the new diet its proper physical characteristics. The gelling agent replaces the fibrous acetate or cotton linters substrates which have been used in larval media for many years. Since the food products in the gelled diet are better utilized by the larvae the total requirement for those products is sharply reduced. In addition, it appears that, if the new diet is adopted, significant labor savings will result and engineering maintenance costs will be reduced. By a very preliminary estimate total savings to the program when screwworms are being reared at a level of 500 million/week could be \$5,000,000 per year or more.

Directors of the program will have to consider all of the aspects of such a change before they can approve a change in larval diets and it is possible that for very good reasons they may never change to the gel diet. Nevertheless, development of the new diet is an outstanding research accomplishment which our group could not have achieved without Bob Harris's input and leadership. We have already adopted the gel as our standard diet in the research laboratory and we are very grateful to Bob for his help. And last but not least, all of us in the screwworm program are grateful to you for having approved this support and cooperation by a member of your staff.

O. H. GRAHAM
Location/Project Leader

cc:

R. L. Harris
J. R. Johnston
R. A. Bram
H. E. Brown
R. E. Reichard



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Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

November 1, 1984

SUBJECT: Research Accomplishments of R. J. Brenner
at Tuxtla Gutierrez

TO: Dr. R. S. Patterson, RL
USDA-ARS-IAMARL
P.O. Box 14565
Gainesville, FL 32604

I endorse your request that Dr. Brenner be considered for non-mandatory Research Personnel Evaluation. During the two years that he worked with Screwworm Research he planned, organized, and conducted items in our research program that were designed to improve our understanding of screwworm ecology in tropical habitats. Before his departure he had published one paper, two had been accepted for publication, and he had prepared two other manuscripts. In addition he has data and plans for at least two more manuscripts. In my opinion this indicates a higher than average level of productivity, especially impressive in view of the remoteness of the location.

After completion of his PhD and before he joined our group, Dr. Brenner completed an 18-months postdoctoral assignment at Riverside and has published the results of that research. It appears to me that he is fully qualified for promotion to GS-12 research entomologist.

O. H. GRAHAM
Location/Project Leader

cc:
J. R. Johnston
R. A. Bram
H. E. Brown



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Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

November 1, 1984

SUBJECT: Transmittal of Report by D. B. Taylor on
the Development of the VF-84 Strain

TO: R. A. Bram

In preparation for the strain change meeting on Nov. 9 Dr. Taylor has prepared a detailed account of the procedures that were used to develop the Villa Flores strain. Information of this type is often lost for lack of documentation and I am delighted that David has taken the time to record all the steps in the development of this strain. I commend him for the careful, painstaking completion of his assignment.

The strain appears to be one of the best developed by ARS scientists. Presumably some decision about its future utilization will be made next week; I for one will recommend that it be accepted for mass production.

O. H. GRAHAM
Location/Project Leader

cc:

J. R. Johnston (w/enclosure)
H. E. Brown (" ")
C. J. Whitten (" ")

*copies of report in
STRAIN DEVELOPMENT
AND manuscript files*



United States
Department of
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Agricultural
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Southern Plains Area

Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

November 1, 1984

SUBJECT: Transmittal of Report on Screwworm Reproductive
Behavior by W. L. Rubink

TO: R. A. Bram

A copy of a report which summarizes the highlights of Dr. Rubink's research in Quintana Roo is enclosed. The study sites near Chetumal have proven to be excellent locations for observing the behavior of wild flies in nature and he is accumulating considerable data that will improve our understanding of screwworm biology and population dynamics in a truly tropical environment. In addition, Drs. Mangan and Welch are using the same study area and Dr. Mackley may soon begin some work there. (The mobile laboratory which you helped us obtain has been in Chetumal since July 1 and has been very useful.)

The technique for labeling and numbering individual flies makes it possible to obtain important information about the survival of fertile females and their dispersion. Do wild flies live longer in Q. R. where weather conditions are highly favorable than they were observed to live in Texas? or, because of more natural enemies or other reasons, are their lives shortened? Do mated females tend to localize under "ideal" conditions or does a random pattern of searching for oviposition sites carry them long distances even if they are leaving wounded animals behind them?

The Chetumal location is presently well removed from sterile fly dispersion but the program may be extended to that area relatively soon. Is a very useful study site now and our group is doing as much as possible. It is apt to be the last area in Mexico where natural screwworm populations can be studied; once it is lost as a work site the research will have to move to Central America. I am hopeful that Bill Rubink will have obtained significant new information about screwworm fecundity, population dynamics, survival and dispersion before abandoning Chetumal.

O. H. Graham

O. H. GRAHAM
Location/Project Leader

cc: (w/enclosure)

J. R. Johnston

H. E. Brown

Hugh

REPRODUCTIVE BEHAVIOR OF NATURAL POPULATIONS OF THE SCREWORM IN QUINTANA ROO, AND OTHER STUDIES--A PROGRESS REPORT

William L. Rubink

A field station was established in Chetumal, Quintana Roo in June, 1984 to pursue ecological/genetic studies of native screwworm population in their native habitat. The initial goals of this project were 1) to survey the area and ascertain the feasibility of conducting research there, 2) to collect data on the reproductive behavior of tropical screwworm populations, including diel activity patterns, longevity, and reproductive behavior from direct observations of individually marked flies (W. Rubink), 3) make blowfly collections (W. Rubink). 4) to collect "true" isofemale lines for cuticular hydrocarbon analyses and population comparisons (R. L. Mangan) and 5) to evaluate artificial wounds (R. Mangan).

Initial indications were of high screwworm populations, in spite of a relatively low density of cattle in the area. All ranchers contacted were well aware of the screwworm, and in only a few days we encountered several natural screwworm infestations in cattle. Ten ranches were located for survey work within a 30 km radius of Chetumal. Several other interesting sites exist, but would require even more extensive travel to do research there. Only two of the chosen ranches are large (200-500 cattle); the others have numbers varying from 15-90.

Observed natural infestations were primarily in vampire bat wounds in cattle, which are numerous, and in sheep. Although swine are numerous, especially in the villages, infestations seem rare in these animals. Dermatobia hominis were also common in cattle, but screwworms are apparently not attracted to the fresh or vacated wounds of these parasites.

Within a month, all except 5 of the more centrally located, and best screwworm-producing, ranches were abandoned as sampling sites. Two ranches on the Belize border south of Chetumal, Ramonal and Allende, and three on the Bay north of Chetumal, San Manuel, Ixtepan, and Sta. Teresa were retained. All of these, though with fewer than 100 cattle per ranch, proved excellent sites for our studies. From the period of 30 June to 26 July a total of 196 masses of eggs were collected from the ten corrals, an average of 0.7 masses/day/corral. The most productive corrals produced as many as 7 masses per day. Over 600 masses have now been collected with only a slight decrease in screwworm activity around sentinel animals as we have progressed into the rainy season. For the period of collection this averages about 1-1.5 egg masses/corral/day. This apparent doubling of fly activity is really only an effect having closed down the less productive

corrals; actual activity levels seemed to decrease slightly during the wet season. However, some ovipositional activity was noted, even in the most inclement weather.

Studies of the reproductive biology of the screwworm has centered around three principal topics. Of prime importance in constructing a life table is the need for understanding the reproductive value and allocation of reproductive resources of the female flies in nature. To this end I am evaluating individual reproductive performance of flies when presented with two different types of wounds, one infested (containing screwworm larvae) and one "fresh" (not with SW larvae). Most, well over 90% of the flies, when presented with a choice of wounds on the same animal, "choose" the already-infested wound. Purulent wounds, especially those previously infested with screwworms, were also very attractive. Indications from flies captured and dissected after ovipositing are that about 20% of these native flies did not place their entire clutch at one site; 100-200 eggs were retained (for subsequent ovipositions?). Whether allocation of reproductive resources, i.e., the actual number of eggs placed on wounds of various degrees of quality, varies is a result which remains to be extracted from the data.

Direct observations corroborated the notion that flies do not deposit all their eggs on a single site. Eggs may be dispersed in several areas on the same wound, or on different wounds on different hosts. There is also a tremendous variation in eggs per oviposition (data from flies captured after ovipositing). Although data analysis is not complete, a cursory inspection revealed that eggs/oviposition ranges at least from 9-359, at that many flies do not lay the entire clutch at once.

To further evaluate the fly's life history and survival in the tropics I began a mark-recapture study using flies marked with special plastic tags (opalithplattchen), originally designed for marking bees, which I have tested and shown to have a negligible effect on screwworm survival. This study is being conducted on two ranches, approximately 6 km. distant from one another, and both on the river between Quintana Roo and northern Belize. Each has established corrals and stanchions which accomodate 2-3 sentinel sheep.

Flies are marked as they visit the sentinel sheep. As may be seen from table 1, approximately 1/4 of the flies marked returned to the sentinel animals on a later day. Most were seen only once again, but two were seen on as many 5 occasions. Of the 48 flies marked 34 visited the wounds only to feed and oviposit, and one came only to oviposit; of the others, 13 came only to feed. One fly was captured in a Shannon-type trap. Flies returning to oviposit did so from 1-2 times, for an average for slightly more than 1 oviposition/fly. Data show a minimum ovipositional period of slightly less than 3 days (72 hours), or as many as 11 days; however, the longer periods may actually reflect subsequent

ovipositional cycles; oviposition may have taken place at 3 day periods on other, non-sentinel sheep, wounds.

Of much interest is a more recent observation of a fly which, marked after oviposition at one site, oviposited a second time at the second site, 6 km distant. This may explain the low recapture rates; some flies are migrating over large distances, in spite of the continuous presence of a host at the original oviposition site. Further studies are planned for mark/recapture via WOT traps to further elucidate migration / emigration / mortality / survivorship / fecundity / allocation of reproductive resources in this tropical environment.

Observations on screwworm ovipositional behavior at the wound revealed important information. Diel activity patterns of ovipositing feeding flies indicate a strongly bimodal, morning/afternoon and crepuscular ovipositional behavior and feeding at wounds is more restricted to non-crepuscular hours (Figure 1). Temperature and humidity measurements are available for correlations with these variables, but data have not been reduced yet.

Individual oviposition and feeding behavior of native wild screwworms on wounds were studied in detail as well. Five behavioral steps are apparent when a screwworm visits a wound. After arrival from 1-5 minutes are spent feeding. If oviposition is the immediate intent of the fly, it also conducts a simultaneous exploration/probing of the wound, primarily the dry-scar surface, with the ovipositor. Just before oviposition begins, the ovipositor is drawn back and forth for 1-2 seconds over the area selected for oviposition, in a "painting" action, perhaps preparing the site with a substrate for the egg mass. Actual oviposition then takes place, and lasts from 6-8 minutes or longer if more than a single oviposition site is used. In most cases, feeding continues during the oviposition period. After oviposition the fly feeds extensively for 1-7 minutes before taking flight.

Of the flies observed, approximately 1/3 arrived only to feed. The ovipositors of these flies are not extended in probing actions. These flies are also much more nervous than ovipositing flies, and easily scared or shaken from the wound. Feeding visits may be as short as a fraction of a second or as long as 15-30 minutes. Precise behavioral data are now being analyzed for accurate description of fly behavior at the wound.

It is noteworthy that single marked flies have been observed to oviposit on as many as 3 different wounds within a few minutes. Other flies have been observed to oviposit over previously existing egg masses. These observations demonstrate that true isofemale lines maybe obtained with 100% security only by directly observing the ovipositional sequence. A marked fly previously observed ovipositing on a sentinel sheep was later observed

feeding on a bat wound on a nearby calf; this may cast some doubt on claims of extreme host specificity.

Blowfly collections have also been made twice in Q. Roo, in late July and in mid September. Bishop traps, baited with either liver or fish were used to sample for other Cochliomyia species (non- C. macellaria or C. hominivorax); two other species are known from Caribbean Island locations (C. aldrichi, C. minima). The initial collection, with the exception of some material lost due to a freezer malfunction, has been mounted, and some specimens were identified by US Museum Taxonomists. Sarcophagids submitted were not identified but will be submitted to a Brazilian sarcophagid specialist for determination. Twenty two specimens were submitted comprising 5 muscid, 5 calliphorid and several sarcophagid genera.

Of special interest among the Calliphorids identified was the presence of a second Chrysomya species, C. megacephala, and Hemilucilia segmentaria. Other species were Chrysomya rufifacies, Cochliomyia macellaria, and Phoenicia eximia (Wiedemann). One or two more shipments of material are planned to complete identifications of all Quintana Roo, and other blowfly material (collections made in an altitudinal study of DR. Mackley) housed in the Tuxtla research insect collection.

Future plans for research in Chetumal are somewhat insecure due to the possibility of sterile fly releases there within a few months. Immediate plans in a cooperative effort with Dr. Welch, are to expand mark/recapture studies to a much larger scale using a triangular grid over wide area. Estimates of immigration/emigration, survivorship, and migration of native screwworms in their natural tropical habitat will result. Dr. Mangan plans further mark/recapture studies to assess habitat selection in the screwworm. Further research on the natural parasite load is also planned, as well as evaluation of other survivorship parameters, including (if possible) meteorological factors other than temperature and humidity.

Publications to result from Chetumal activities:

1. Reproductive behavior of native screwworm flies in tropical Mexico (Annals Entom. Soc. America). To deal with 1) adult behavior patterns on host, 2) diel activity patterns, and 3) natural fecundity of the screwworm in Q. Roo. (Data nearly complete, lacking data summary & analysis - Rubink)
2. Feral screwworm dispersal patterns and survivorship: Results of mark: recapture studies of native populations. (Env. Entomology) (Research in progress - Rubink, Welch) To treat the longevity and dispersal patterns of individually marked native flies using WOT traps and sentinel animals.
3. Blowflies of southern Q. Roo, including reports of range extensions for several species. (Collections complete; mounting, identification, data summary/analysis lacking)

TABLE 1. CHETUMAL MARK-RECAPTURE, 27/VIII - 8/X/84

	<u>RML</u>	<u>ALL</u>
Total flies marked	23	15
Total flies recaptured	7	4
Average number of ovipositions per fly (range)	1.38(1-3)	1.11(1-2)
Average time between oviposition (range)	140 hrs.(71-256)	
Proportion of flies ovipositing/feeding	24/13	
Number of flies returning once	7	
Number of flies returning thrice	2	
Number of flies returning more than 3 times	2 (max 4 times)	

FECHASA INCCUSURAS: 17-VII 82 3-VIII/84

OVIPOSITA

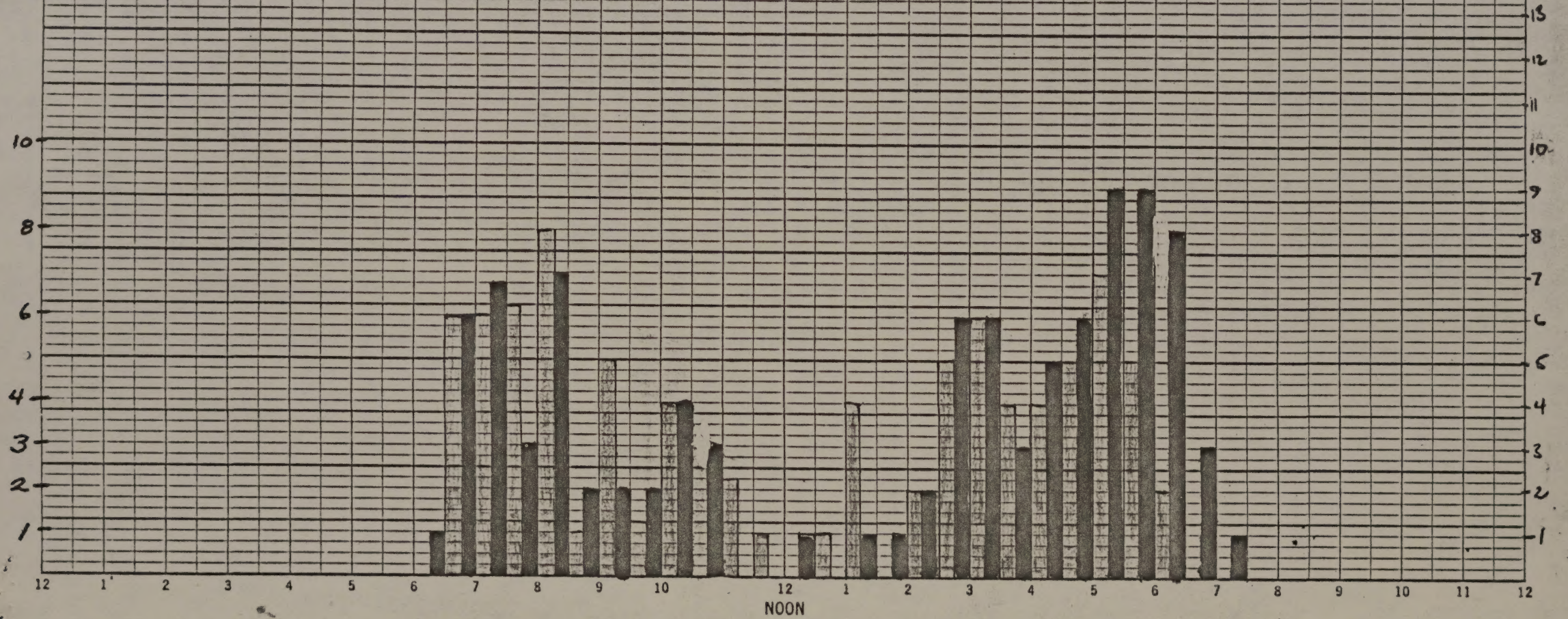
NO OVIPOSITA
(SE ALIMENTA)

DIEL ACTIVITY PATTERNS OF NATIVE
SCREWWORKS. (17-VII-84 to 3-VIII-84)

• OVIPOSITING FLIES

FLIES ARRIVING ONLY TO FEED.

No of flies Observed



TIME OF DAY

1 6 7 3 7 2 2 2 4 3 1 1 1 2 6 4 3 6 6 2 2 1



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Southern Plains Area

Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

November 5, 1984

Dr. W. Takken
Acting Director
Biological Control of Tsetse by the
Sterile Insect Technique
P.O. Box 76
Vom, Plateau State
NIGERIA

Dear Dr. Takken:

Dr. Ron Lowe has asked me to reply to your inquiry of October 12 concerning the use of acridine orange as a sperm marker for the screwworm fly. This marker was developed by Dr. R. J. Brenner during the time he worked at this location and I am enclosing a Xerox copy of a recent publication which describes the technique. Dr. Brenner also has another manuscript in preparation. For further information I suggest you correspond with him at the following address:

Dr. R. J. Brenner
USDA-ARS-Insect Affecting Man
& Animals Research Laboratory
P.O. Box 14565
Gainesville, Florida 32604

We hope that the sperm marker will facilitate future field evaluations of new strains of mass-produced screwworm flies but practical usefulness is at the moment limited by our inability to capture significant numbers of wild females. Perhaps in the case of tsetse this would not be a limitation and you might find that the technique would be of value to you.

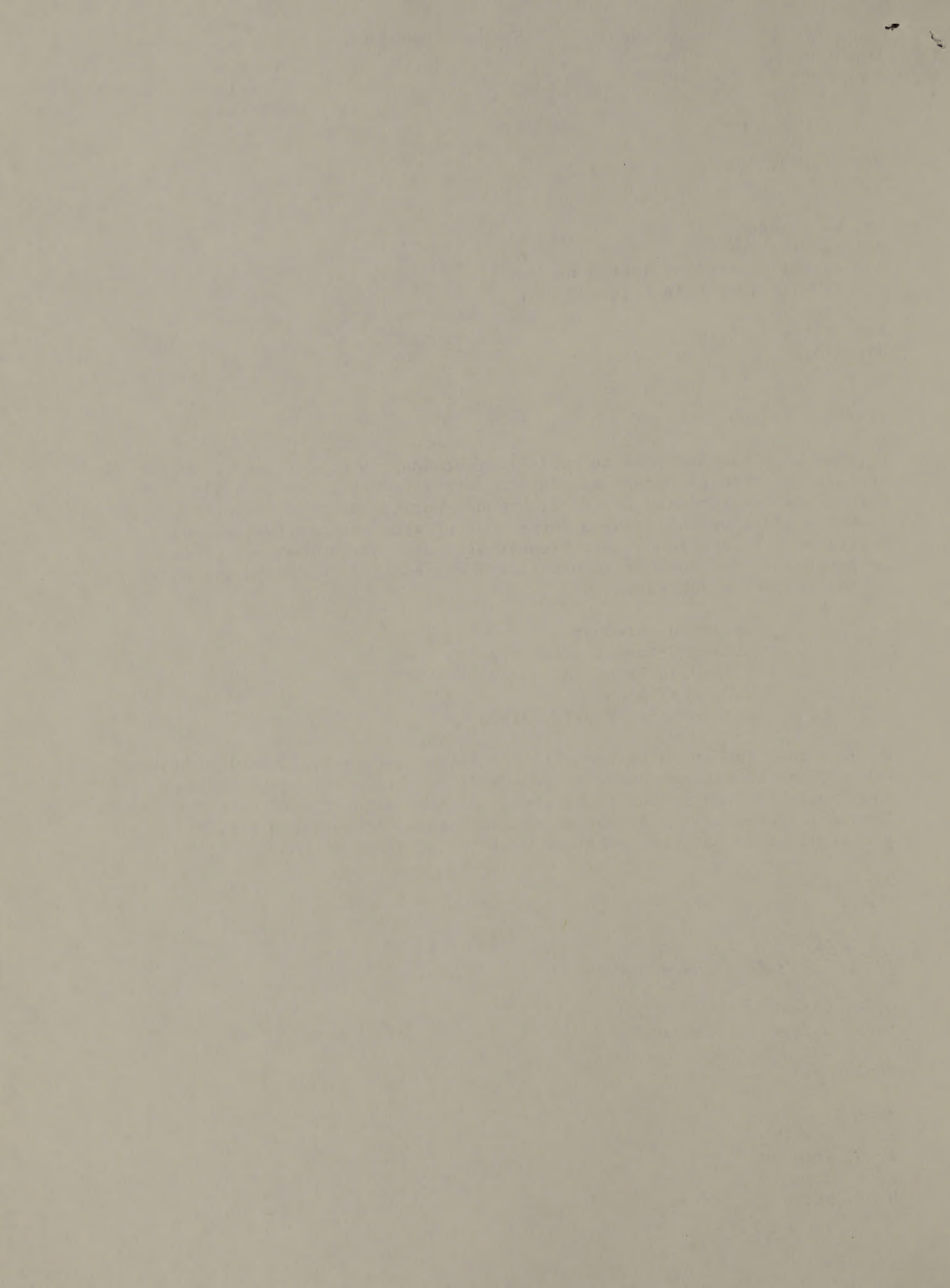
Sincerely,

O. H. GRAHAM
Location/Project Leader

Enclosure

cc:

R. E. Lowe
R. J. Brenner
R. A. Bram
H. E. Brown





BICOT

BIOLOGICAL CONTROL OF TSETSE BY THE STERILE INSECT TECHNIQUE

FEDERAL DEPT. OF PEST CONTROL SERVICES, P.O. BOX 76, VOM, PLATEAU STATE, NIGERIA
CABLE: BICOT VOM

Ref: FDPCS/BICOT/VOM/7/486.

12th October, 1984.

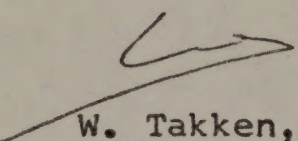
Dear Dr. Lowe,

I enjoyed your presentation of the Screwworm fly program in Mexico at the Int. Congress of Entomology in Hamburg. You mentioned the use of a sperm marker, which has now become a routine matter in your release program.

You are aware that tsetse sperm can be labelled with Radio-isotopes by uptake during feeding, but the amount of labelled material transferred during mating is too little to be of practical use under field conditions.

I would be highly interested to receive any documentation you might have about this (new) technique. We are interested to try it in our tsetse release program.

Yours sincerely,


W. Takken,
Acting Director.

Dr. R. Lowe,
USDA, Aphis, VS
Apartado Postal 544,
29000 Tuxtla GTZ, CHIAPAS,
MEXICO.

*Hugh —
Maybe you should respond
to this by sending copies of
the publications, etc.
Kon —*

cc: D.A..Lindquist.



COMISION MEXICO-AMERICANA PARA LA ERRADICACION DEL GUSANO BARRENADOR

LA ENERGIA ATOMICA AL SERVICIO DEL GANADERO

November 19, 1984

NPV/1023

SUBJECT: Dr. R.L. Harris/New Gelled Diet
for Larval Rearing

TO: Dr. Donald A. Witzel, LD
USDA-ARS-VTERL
P.O. Box GE
College Station, TX 77841

We would like to express our recognition of the significance of Dr. R.L. Harris' research and development of a new larval medium which could be used in this Commission's sterile screwworm fly production plant in Tuxtla. This new diet includes a gelling agent, resulting in a medium which more closely resembles the consistency of the flesh upon which wild larvae feed.

Although more information is needed before we could change to the gelled diet in our production plant, if indeed such a decision were taken it is clear that significant production expenses would be reduced. Substantial savings would be realized in the cost of media, since it is better utilized by the larvae in the gelled diet than in the diet we are currently using. We would also anticipate reduced labor costs.

Regardless of whether the gelled diet would be implemented in the Tuxtla production plant, the development of this diet, and the success shown by its now standard use in the ARS laboratory in Tuxtla, represent a major research breakthrough. We are grateful for Dr. Harris' work, which promises great potential for the future.

Robert E. Reichard
Co-Director

Nazario Pineda Vargas
Director

cc: Dr. R.L. Harris
Dr. R. Bram
Dr. O.H. Graham
Dr. H. Brown
Dr. R. Lowe
Dr. A. Pagaza
Dr. N. Meyer

psc

TRIP REPORT

November 19, 1984

Name: RALPH A. BRAM

Title: National Program Leader
Insects Affecting Man & Animals and Parasitology

Date of Travel: November 8-11, 1984

Location: Screwworm Research Project
Tuxtla Gutierrez, Mexico

Purpose of Meeting: To review the ARS screwworm research program and plan future program actions; to participate in the APHIS screwworm strain change meeting.

Participants/Contacts: P. Murrman, AAD, Southern Plains Area; ARS Screwworm Project Leaders and Research Scientists from Tuxtla Gutierrez, Fargo, and Weslaco; the strain change meeting was chaired by R. E. Reichard, Co-Director of the Mexico-American Screwworm Eradication Commission and included the ARS contingent as well as Screwworm Commission line and staff officials.

Highlights: (1) Dr. Murrman announced that Dr. H. E. Brown has been selected as the next Leader of the Screwworm Research Project at Tuxtla Gutierrez. (2) The single CRIS for screwworm research at Tuxtla Gutierrez will be broken into 4 CRIS's to accurately identify and manage program activities as follows: (a) Screwworm field ecology, population dynamics, and population genetics; (b) Screwworm genetics and strain development; (c) Screwworm nutrition, physiology, and mass rearing technology; and (d) Screwworm attraction and toxicant bait systems. (3) Progress continues on the establishment of a 2 SY satellite laboratory in Costa Rica. Objectives of this satellite laboratory would focus on research to support the maintenance of a barrier at the Isthmus of Tehauntepec and establishment of base-line data necessary for future eradication programs in Central America. (4) An effective gelatinized diet has been formulated under the leadership of Dr. R. L. Harris, and its use is now a standard procedure in the ARS research laboratory. The Screwworm Commission Methods Development group must now adapt this new technology to the mass production facility.

General Commentary: The Mexico-American Screwworm Eradication program has essentially achieved the goal of establishing a sterile male barrier at the Isthmus of Tehauntepec. Operations now focus on consolidating the barrier and reducing populations in the Yucatan Peninsula in order to protect the barrier. Prospects are favorable that the program will continue into Central America, at least through Guatamala at first, but eventually to Panama. ARS research activities continue to be responsive to program needs and coordinated between the two major efforts at Tuxtla Gutierrez and Fargo.

Recommendations: (1) Develop new CRIS's for Tuxtla Gutierrez. (2) Initiate administrative measures to establish a satellite laboratory in Costa Rica including: (a) Reimbursable Agreement with American Embassy, San Jose; (b) Cooperative Agreement with the Costa Rican Ministry of Agriculture; (c) Establish laboratory in Costa Rica requiring one-time only expenditure of \$75,000 from Administrator's Contingency Fund; (d) Select two scientists from Tuxtla Gutierrez to be assigned to Costa Rica; (e) Target date for above activities to be February 1, 1985. (3) Establish a Screwworm Research Unit within the Metabolism and Radiation Research Laboratory, Fargo, North Dakota, which is composed of 3 SY's and encompasses CRIS #3915-20480-006 and 3915-20480-001.

cc: T. J. Army
D. B. Laster
D. D. King

R. F. Barnes
J. R. Johnston
P. J. Fitzgerald

K. L. Lebsack
O. H. Graham
C. J. Whitten

C. H. Schmidt
H. E. Brown

Biological control.--Prior to the two major eradication programs, when screwworms were the scourge of southern U.S. livestock producers, all possible approaches to screwworm control were considered by research entomologists who were working on the problem, including the use of parasites, predators, and pathogens. Some of the research on the use of parasitic insects to control screwworms was discussed by Marlatt (1932) and Roberts (1933, 1934, 1935). Much of this early work is of limited value because the researchers did not realize that they were working with Cochliomyia macellaria as well as C. hominivorax, the true screwworm. Nevertheless, it was shown that the prepupae and pupae of blow flies are frequently attacked by parasitic insects, most of them tiny wasps in the order Hymenoptera, and that these parasites contribute to natural control in some ecological situations. The following tabulation from Roberts (1935) lists seven species of Hymenoptera that parasitize blow fly larvae and three other species that attack pupae. For the most part, he collected these parasites by exposing larvae and pupae in the field in the vicinity of animal carcasses. The bionomics and host preferences were then studied in the laboratory.

Larval parasites:

Braconidae: Alysia ridibundaA. fossulataCynipidae: Psilodora sp.Xyalosema armataXylosema sp.Chalcididae: Brachymeria fonscolombeiEniaca texana

Pupal parasites:

Braconidae: Aphaereta muscaeDiapriidae: Trichopria hirticollisPteromalidae: Marmoniella vitripennis

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Lindquist (1932, 1940) studied one wasp, Alysia ridibunda, that parasitizes blow flies in New Mexico and Arizona. He was not able to raise this parasite on C. macellaria in the laboratory but reared it in large numbers on Lucilia sericata and L. mexicana. When released in the field near Uvalde, Tex., the parasite was quite abundant for about a year but within 2 years had almost disappeared. In the laboratory, the parasite seemed to prefer maggots other than screwworms. He observed that, in the laboratory, A. ridibunda will place its eggs inside the body of screwworm larvae, but that both host and parasite eventually die. Larvae collected from 241 screwworm infestations in the field when the wasps were active around carcasses did not yield any parasites, and Lindquist concluded that the parasite was not exerting an appreciable degree of screwworm control in that area. No other more promising parasitoid was encountered before the research was discontinued. Baumhover et al. (1966) mentioned that laboratory colonies of screwworms are occasionally injured by the pupal parasite Nasonia vitripennis (Hymenoptera:Pteromalidae), but the role of this wasp in nature has never been assessed.



United States
Department of
Agriculture

Agricultural
Research
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Southern Region
Southern Plains
Area

Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

Diciembre 6, 1984

ASUNTO: Perfeccionamiento de Sistemas de Trampeo
de Gusano Barrenador

PARA: Dr. Arturo Martinez y Tapia
Dr. David Hoffman

Hace como un mes ustedes me mostraron un proyecto de nuevas actividades para el grupo de Desarrollo de Metodos. Ese proyecto incluía pruebas las cuales se podrían conducir para perfeccionar los sistemas de trampeo de adultos de gusano barrenador. Como el Dr. R. D. Peterson dedicó parte de su esfuerzo de investigación en Mission y después en Tuxtla a esta actividad, le pedí un resumen de sus observaciones y recomendaciones. Respondió con un excelente resumen de sus estudios, el cual estoy anexando, con la seguridad de que será de mucha ayuda tanto para ustedes como para cualquiera de los investigadores de ARS quienes podrían trabajar en esta área en el futuro.

O. H. GRAHAM
Jefe de Investigación Científica

Anexo

cc:

H. E. Brown
R. A. Bram
J. R. Johnston
H. C. Hofmann



United States
Department of
Agriculture

Agricultural
Research
Service

North Central Region
Metabolism and
Radiation Research
Laboratory

P.O. Box 5674
State University Station
Fargo, North Dakota
58105

November 7, 1984

SUBJECT: Improved Screwworm Trapping Systems

TO: O. H. Graham
Location/Project Leader
USDA-ARS-Screwworm
P.O. Box 267
Weslaco, Texas 78572

In reply to your letter of October 25, the following is a summary of my part-time work on trapping systems while in Mission and Tuxtla.

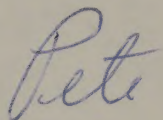
As you know, a number of workers have tried to improve the wind oriented trap(WOT). I worked on the problem in Mission before I moved to Tuxtla. Most improvements centered on reducing escapes from the trap or keeping the catch alive longer. I concluded that improvements on the existing WOT design yielded only marginal improvements in trap catch while the trap alterations increased the possibility of trap malfunction. New trap prototypes were never as productive as the standard yellow WOT. I felt that any new trapping system would benefit by using the multidirectional orientation concept. Trap placement above ground and trap color or color patterns need to be examined in the Central American context.

In Tuxtla, I began testing the feasibility of using the bait station components in a new trap. From trapping studies around the plant using traps hung over kill buckets, I concluded that traps constructed with heavy duty construction paper as the bait station was in Texas were unsuitable. Specifically, they did not hold up in the wet season and mold buildup was more apparent than in Texas. The exact role the mold played in trap efficiency was not determined, however. Some problems were also encountered in keeping the bait toxicant paste attached to the underside of the roof during high temperatures. Thin aluminum roofs were then used and eventually a sliding panel system was used with good results. The paper panels with paste can be carried to the field weekly and slid into the underside runners. The aluminum roof can be reused but also would be more susceptible to theft in remote areas. My next effort was with the Bait Attractant Trap(BAT) which involved hanging a screen cone with collection cup below a flat cone metal roof on the underside of which was placed a paper ring with paste. It was a version of the bait station with an improved collection system. Preliminary results indicated the BAT was an improvement but needed further refinements such as an easier way to change the bait toxicant.

My feelings on the bait station principle applied to a trap is that it would be more cumbersome to manage (roofs, panels, paste and wax preparation, escapes, etc.) than the WOT. Used as a bait station to control screwworms the principle may have merit especially along routes of cattle movements or at inspection stations. If the BAT is seen as worthwhile to pursue further, I would suggest trying SL-4 and see if a thin honeycomb reusable panel could be used to hold the paste.

A sticky trap was investigated next. The idea came from the Zoecon line of stick traps. Two configurations of the sticky panel used in conjunction with cotton and plastic coated wicks were evaluated. Best wick type was determined comparing each in a WOT against a WOT with a bottle of SL-4 as the standard. One large (short and thick) wick consistently caught 25-30% of what the bottle caught and was superior to the small (long and thin) or pairs of wicks over a weeks time. During the first three days the wick was most effective. Considering that the large wick held 10x less attractant than a bottle, I felt the wick performed well. The Zoecon traps were tried in various presentations. The pop-open triangle (Pherocon II) was the most promising. This is the same trap Cris Hoffmann and Jim Bruce tested in studies near Guadalajara. I had best results turning the trap inside out i.e. placing the stickem on the outside then placing one large plastic coated wick with SL-4 inside. Over four days we caught 26% of what a WOT with 40 ml of swormlure produced (2394 vs 844 flies both sexes). I feel this trap would be good in remote areas or at quarantine stations if further refined. Fly identification on the stickem is possible after 24 hours but I have not checked to see if flies left longer are identifiable. Unless an inspector is trained in identification in stickem the panels would have to be sent to a central lab. Flies could probably not be successfully dissected to aid other studies. Cris knows a source for the Zoecon trap. Dr. Gerandus Stahl, an entomologist with Zoecon in Palo Alto should be able to provide further information if needed.

If I can be of further assistance don't hesitate to contact me.



Richard D. Peterson II
Research Entomologist

cc: C. J. Whitten
R. A. Bram
H. E. Brown
J. B. Welch

